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A NEW SPECIES OF *DENDROBATES*
(ANURA: DENDROBATIDAE)
FROM THE LOWLAND RAIN FORESTS
OF WESTERN ECUADOR

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ABSTRACT: *Dendrobates erythromos* sp. nov. is described from the lowlands of western Ecuador. The new species is tentatively assigned to the genus *Dendrobates* on morphological grounds and appears to be most closely allied to the Colombian *D. ingeri*. This species may have specific microhabitat requirements which result in a spotty distribution.

INTRODUCTION

In January of 1978 several specimens of an apparently undescribed species of dendrobatid frog were collected at the Centro Científico Río Palenque in the Pacific lowlands of Ecuador. Preparation of an account of the herpetofauna of the region requires that a name be assigned to this population, and here we describe the species on the basis of material in the Museum of Comparative Zoology (MCZ) and the National Museum of Natural History (USNM).

The generic partitioning of dendrobatid frogs is in a state of flux and the characters which have traditionally been used to define the genera are being supplanted by new ones. Following the criteria of Savage (1968) and Silverstone (1976) this new species would be assigned to *Phyllobates*. However, this genus has recently been defined as a monophyletic group (in the cladistic sense) on the basis of a biochemical synapomorphy by Myers et al. (1978) and consists of only four of the species recognized by Silverstone plus one newly

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described species. All of the remaining species of *Phyllobates* recognized by Silverstone (the *femoralis*, *pictus*, and *trivittatus* groups) were reassigned to *Dendrobates*. The new species most closely resembles those in Silverstone's *pictus* group on the basis of size, coloration, and the absence of toe webbing and we tentatively assign it to the genus *Dendrobates*.

Dendrobates erythromos sp. nov.

Holotype. MCZ 96384, an adult female collected at the Centro Científico Río Palenque, 47 km S of Santo Domingo de los Colorados, Provincia Pichincha, Ecuador, 170 m, on 17 January 1978 by Gregory O. Vigle.

Paratypes. All are topotypes: MCZ 96381-83, 96385, 94896 (lot of 3 tadpoles from back of 96385), USNM 211169-70.

Diagnosis. A dendrobatid frog with the following combination of characters: 1.) Teeth present. 2.) Omosternum present. 3.) First



Figure 1. Paratype of *Dendrobates erythromos* (MCZ 96381). The slightly paler area on the dorsal surface of the forearm is the bright orange flash mark.

finger longer than second. 4.) Toe webbing absent. 5.) Muscle tissue flecked with black pigment. 6.) In life, the dorsum is dark brown and the venter is black with pale blue marbling. 7.) A bright reddish-orange flash mark on the posterodorsal surface of the upper arm in life. 8.) Size medium, to 23.5 mm snout-vent length (SVL).

The above combination of morphological characters, combined with the lack of any dorsal or dorsolateral striping and the bright orange flash marks distinguish *Dendrobates erythromos* from all other known dendrobatid frogs.

Description. Snout-vent length to 23.4 mm; four adult females 21.5–23.4 mm; two adult males 20.4–22.6 mm; one immature female 18.6 mm.

Skin smooth to very finely pitted dorsally, slightly rugose laterally and on posterior surface of thighs; smooth on venter and limbs. Head as wide as body or slightly wider, widest at jaw articulations. Eyes prominent, diameter about one and one-half times the length of the snout; width of upper eyelid less than interorbital width. Snout short, truncate in dorsal and lateral aspect. Canthus rostralis rounded; loreal region flat to slightly concave. Tympanum round, about one-half diameter of orbit; posterodorsal portion concealed.

Relative lengths of appressed fingers $3 > 4 > 2 > 1$, each having a distinct disc expanded about 1.5 times the width of the distal end of the adjacent phalanx. First finger longer than second if not appressed. A large outer metacarpal tubercle and a smaller, less prominent inner metacarpal tubercle at the base of the palm. One slightly prominent subarticular tubercle on fingers one and two and two slightly less prominent tubercles on fingers three and four; all are low with rounded surfaces. Relative lengths of appressed toes $4 > 5 > 3 > 2 > 1$. Toes have distinct discs approximately 1.5 times the width of the distal end of the adjacent phalanx. A small elongated outer metatarsal tubercle and a smaller, round inner metatarsal tubercle at the base of the foot. Indistinct subarticular tubercles on toes; one on toes one and two, two on toes three and five, and three on toe four. A slightly prominent curved tarsal fold on the inner side with a weakly developed tubercle at the proximal end. Palms and soles flattened on bottom and slightly fleshy. Digits lacking lateral fringes (or with very narrow ones on toes), webbing, and supernumerary tubercles.

Palatine bones absent. Maxillary and premaxillary teeth present. Omosternum present. Muscle tissue flecked with black pigment. Paired vocal slits in adult males; single subgular vocal sac.

Measurements of holotype. The undissected holotype is the largest individual in the type series. The following measurements are to the nearest 0.1 mm as measured on dial calipers. Snout to vent 23.4; tibia from heel to fold of skin on knee 9.6; greatest width of body 8.4; greatest width of head 8.5; head length from tip of snout to angle of jaws 7.6; length of snout from anterior edge of orbit to tip of snout 2.4; diameter of orbit 3.6; diameter of tympanum 1.9; length from proximal edge of large palmar tubercle to tip of third finger 5.7; width of disc of third finger 0.6; width of distal end of adjacent phalanx 0.4.

Color in Life. Dorsum dark brown, appearing almost black in some specimens. The sides are black or very dark gray. Bright reddish-orange flash marks on the posterodorsal surfaces of the upper arms, extending from the axilla to the elbow and sometimes slightly beyond to the forearm. Anterior surface of arms and hands dark brown. The dorsal surfaces of the hind limbs are banded dark brown and black. The throat and ventral surface of the body are black with pale blue marbling which extends slightly up the sides. The iris is brown.

Color in Preservative. The dorsal and lateral surfaces are black to very dark brown. The banding on the dorsal surface of the hind limbs is obscure. The flash marks on the upper arm are white. The ventral surface is black with dull gray marbling.

Tadpoles. The following description is based on the paratypic lot of tadpoles (MCZ 94896) taken from the back of an adult male (MCZ 96385) on 18 January 1978. Only two of the three tadpoles are in good condition and these are the ones used for the description.

The tadpoles are in stage 25 (Gosner 1963) and measure 9.04–9.60 mm total length (measurements taken with ocular micrometer). The head and body measure 3.20–3.68 mm and constitute 35–38% of the total length. The body is somewhat flattened with the width about 1.25 times the depth of the body. The eyes and nostrils are directed dorsolaterally. The spiracle is sinistral and the anus is dextral.

The tail has a relatively low fin and is as deep as the body or slightly deeper posteriorly; the dorsal fin extends forward slightly past the level of the anus.

There is one row of pigmented teeth on the anterior labium. The beak is keratinized, the upper jaw slightly convex anteriorly and the lower jaw in a strong "V" shape. The oral disc is laterally indented. There is a single row of small, blunt papillae which occur continuously along the lateral and posterior edges of the oral disc and are absent from the anterior edge.

The ground color is pale buff, heavily speckled with brown on the dorsal surface of the body. The venter is lightly pigmented anteriorly and heavily speckled posteriorly with brown. The brown speckling on the tail is restricted to the dorsal aspect and the fins are unmarked.

Etymology. The specific epithet is derived from the Greek *erythros*, meaning red, and *omos*, meaning upper arm, in reference to the distinctive reddish-orange flash marks on the posterodorsal surface of the upper arm.

Natural History. *Dendrobates erythromos* is known only from the Centro Científico Río Palenque. The forest there is considered to be tropical wet forest in the sense of Holdridge (1967) although available climatic data do not seem to match this physiognomy (Dodson and Gentry 1978). The frogs are apparently restricted to a single creek system within this patch of forest. All of the specimens have come from along the banks of Lodo and Sherd Creeks above trail 3a (see Dodson and Gentry 1978:ix for map of station). The forest along these creeks has a somewhat broken canopy with significant amounts of bamboo and other second-growth vegetation mixed in with the tall trees. The relief is rather steep and much of the openness of the canopy appears to be due to tree falls, although there has been some cutting in this area. The creeks flow over rocky or sandy beds and parts of them become dry during the end of the dry season. *Dendrobates erythromos* has been taken along these stream beds in January, when water levels were still low prior to the onset of the rainy season. Several specimens were collected along a dry portion of the bed of Lodo Creek although the majority were taken near flowing water. The frogs were never observed in the water but came from areas near the stream with good deposits of leaf litter and fairly heavy understory vegetation. They seemed to

prefer those areas with relatively closed canopies, avoiding the numerous light gaps along the streams.

All of the frogs of this species were taken during the day as they were active on the surface of the litter and ground. They were quite wary and difficult to approach and when pursued they sought shelter under the litter and in dense thickets of understory vegetation. Calls tentatively associated with this species were soft repetitive chirps.

Three other species of dendrobatids are known from the Centro Científico Río Palenque. They are *Dendrobates espinosai*, *D. histrionicus*, and *Colostethus infraguttatus*. Only the much smaller *D. espinosai* has been found syntopically with *d. erythromos*, although *D. histrionicus* is common in the adjacent forest away from the creeks.

DISCUSSION

Dendrobates erythromos most closely resembles *D. ingeri*, a species known only from a single locality in Amazonian Colombia. The two species are very similar morphologically, both sharing maxillary and premaxillary teeth and a light spot in the axilla and upper arm and both lacking lateral stripes. The dorsum of *D. ingeri* is very granular and it has a light calf spot and is easily distinguished from *D. erythromos*. The two species are probably closely allied; Silverstone (1976) placed *D. ingeri* closest to *D. pictus* within his *pictus* group. Although *D. pictus* does have lateral stripes and some specimens lack premaxillary and maxillary teeth, this arrangement does seem to have validity. The tadpoles of *D. erythromos* resemble those of *D. pictus* rather closely; those of *D. ingeri* are unknown. A fourth species, *D. parvulus*, was also associated with *D. pictus* by Silverstone, but it seems to be somewhat more distantly allied with the other three species. Silverstone believed that his *pictus* group might not be a natural group and recognized three different assemblages within it. The three species he associated with *D. pictus*, along with *D. erythromos*, do seem to constitute a group of similar organisms, but further information regarding calls and skin toxins will be necessary before the relationships can be worked out.

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